

Serial No.: 10/552,857

Response to Office Action mailed: January 6, 2011

Amendment Dated: April 18, 2011

Amendments to the specification:

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-82. (canceled)

83. (new) A nucleic acid construct comprising

 a first nucleic acid portion encoding a chalcone synthase (CHS), said first nucleic acid portion comprising a nucleotide sequence selected from the group consisting of:

 (a1) Sequence ID No. 1, 3, 5 and 7;

 (b1) nucleotide sequences encoding Sequence ID No. 2, 4, 6, and 8; and

 (c1) functionally active variants of the sequences recited in (a1) and (b1), said functionally active variants having at least 95% identity to the sequences recited in (a1) or (b1), respectively; and

 a second nucleic acid portion encoding anthocyanine reductase, said second nucleic acid portion comprising a nucleotide sequence selected from the group consisting of:

 (a2) Sequence ID No. 9;

 (b2) nucleotide sequences encoding Sequence ID No. 10; and

 (c2) functionally active variants of the sequences recited in (a2) and (b2), said functionally active variants having at least 95% identity to the sequences recited in (a2) or (b2), respectively;

 said construct increasing the levels of both CHS and anthocyanine reductase when the construct is introduced into a plant cell.

84. (new) The nucleic acid construct according to claim 83, further comprising a third nucleic acid portion encoding a leucoanthocyanidine reductase (LAR), said third nucleic acid

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portion comprising a nucleotide sequence selected from the group consisting of:

(a3) Sequence ID No. 11, 13 and 15;

(b3) nucleotide sequences encoding Sequence ID No. 12, 14 and 16; and

(c3) functionally active variants of the sequences recited in (a3) and (b3), said

functionally active variants having at least 95% identity to the sequence recited in (a3) or (b3), respectively;

said construct increasing the levels of each of the CHS, the anthocyanine reductase and the LAR when the construct is introduced into a plant cell.

85. (new) The nucleic acid construct according to claim 84 wherein the third nucleic acid portion is a functionally active variant of the nucleotide sequence of (a3) or (b3) with one or more nucleotide changes, all of which result in conservative amino acid substitutions,

the first nucleic acid portion is a functionally active variant of the nucleotide sequence of (a1) or (b1) with one or more nucleotide changes, all of which result in conservative amino acid substitutions; and

the second nucleic acid portion is a functionally active variant of the nucleotide sequence of (a2) or (b2) with one or more nucleotide changes, all of which result in conservative amino acid substitutions.

86. (new) The nucleic acid construct according to claim 83, wherein the first nucleic acid portion is a functionally active variant of the nucleotide sequence of (a1) or (b1) with one or more nucleotide changes, all of which result in conservative amino acid substitutions.

87. (new). The nucleic acid construct according to claim 86, wherein the second nucleic acid portion is a functionally active variant of the nucleotide sequence of (a2) or (b2) with one or more nucleotide changes, all of which result in conservative amino acid substitutions.

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88. (new). The nucleic acid construct according to claim 83, wherein the second nucleic acid portion is a functionally active variant of the nucleotide sequence of (a2) or (b2) with one or more nucleotide changes, all of which result in conservative amino acid substitutions.

89. (new) The nucleic acid construct according to claim 83 wherein said first nucleic acid portion comprises a nucleotide sequence selected from the group consisting of:

(a1.1) Sequence ID No. 1; and

(b1.1) nucleotide sequences encoding Sequence ID No. 2; and

(c1.1) functionally active variants of the sequences recited in (a1.1) and (b1.1), said functionally active variants having at least 95% identity to the sequences recited in (a1.1) or (b1.1), respectively

said second nucleic acid portion comprises a nucleotide sequence selected from the group consisting of:

(a2.1) Sequence ID No. 9;

(b2.1) nucleotide sequences encoding Sequence ID No. 10, and

(c2.1) functionally active variants of the sequences recited in (a2.1) and (b2.1), said functionally active variants having at least 95% identity to the sequences recited in (a2.1) or (b2.1), respectively.

90. (new) The nucleic acid construct according to claim 83 wherein said first nucleic acid portion comprises a nucleotide sequence selected from the group consisting of:

Sequence ID No. 1; and

nucleotide sequences encoding Sequence ID No. 2; and

said second nucleic acid portion comprises a nucleotide sequence selected from the group consisting of:

Sequence ID No. 9; and

nucleotide sequences encoding Sequence ID No. 10.

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91. (new) The nucleic acid construct according to claim 90 further comprising a third nucleic acid portion encoding a LAR, said third nucleic acid portion comprising a nucleotide sequence selected from the groups consisting of:

Sequence ID No. 11; and

nucleotide sequences encoding Sequence ID No. 12.

92. (new) A plant cell, plant, plant seed or other plant part, having incorporated therein the nucleic acid construct according to claim 83, wherein the CHS and anthocyanidine reductase encoded by the construct are expressed.

93. (new) A method of modifying one or more processes selected from the group consisting of condensed tannin biosynthesis; protein binding; metal chelation; anti oxidation; UV-light absorption; and plant defense to a biotic stress in a plant, said method comprising introducing into said plant an effective amount of the nucleic acid construct according to claim 83.

94. (new) The method according to claim 93, wherein the method comprises modifying plant defense to biotic stress and the biotic stress is selected from the group consisting of viruses, micro-organisms, insects and fungal pathogens.

95. (new) The method according to claim 94 wherein said nucleic acid construct further comprises a third nucleic acid portion encoding LAR, said third nucleic acid portion comprising a nucleotide sequence selected from the group consisting of:

(a3) Sequence ID No. 11;

(b3) nucleotide sequences encoding Sequence ID No. 12; and

(c3) functionally active variants of the sequences recited in (a3) and (b3), said functionally active variants having at least 95% identity to the sequences recited in (a3) or (b3), respectively;

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said construct increasing the levels of each of the CHS, the anthocyanine reductase and the LAR when the construct is introduced into a plant cell.

96. (new) A method of modifying forage quality of a plant by disrupting protein foam and/or conferring protection from rumen pasture bloat, said method comprising introducing into said plant an effective amount of the nucleic acid construct according to claim 83.

97. (new) The method according to claim 96 wherein said nucleic acid construct further comprises a third nucleic acid portion encoding LAR, said third nucleic acid portion comprising a nucleotide sequence selected from the group consisting of:

(a3) Sequence ID No. 11;

(b3) nucleotide sequences encoding Sequence ID No. 12; and

(c3) functionally active variants of the sequences recited in (a3) and (b3), said functionally active variants having at least 95% identity to the sequences recited in (a3) or (b3), respectively;

said construct increasing the levels of each of the CHS, the anthrocyanine reductase and the LAR when the construct is introduced into a plant cell.

98. (new) A nucleic acid construct comprising

a first nucleic acid portion for reducing the amount of chalcone synthase (CHS), said first nucleic acid portion comprising a nucleotide sequence selected from the group consisting of:

(A1) Sequence ID No. 1, 3, 5 and 7 and the complements thereof;

(B1) nucleotide sequences encoding Sequence ID No. 2, 4, 6, and 8 and the complements thereof; and

(C1) functionally active fragments of the sequences recited in (A1) , and (B1), said functionally active fragments having a size of at least 60 nucleotides; and

a second nucleic acid portion for reducing anthocyanine reductase, said second nucleic

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acid portion comprising a nucleotide sequence selected from the group consisting of:

(A2) Sequence ID No. 9 and the complement thereof;

(B2) nucleotide sequences encoding Sequence ID No. 10 and the complement thereof; and

(C2) functionally active fragments of the sequences recited in (A12) and (B2), said functionally active fragments having a size of at least 60 nucleotides;

said construct reducing the levels of both CHS and anthocyanine reductase when the construct is introduced into a plant cell.

99. (new) The nucleic acid construct of claim 98, wherein

the first nucleic acid portion comprises a nucleotide sequence selected from the group consisting of:

(A1.1) full-length sequences antisense to Sequence ID No. 1;

(B1.1) full-length sequences antisense to nucleotide sequences encoding Sequence ID No. 2; and

(C1.1) functionally active fragments of the sequences recited in (A1.1) and (B1.1), said functionally active fragments having a size of at least 60 nucleotides; and

the second nucleic acid portion comprises a nucleotide sequence selected from the group consisting of:

(A2.1) full-length sequences antisense Sequence ID No. 9;

(B2.1) full length sequences antisense to nucleotide sequences encoding Sequence ID No. 10; and

(C2.1) functionally active fragments of the sequences recited in (A2.1) and (B2.1), said functionally active fragments having a size of at least 60 nucleotides.

100. (new) The nucleic acid construct according to claim 98, further comprising a third nucleic acid portion for reducing the amount of leucoanthocyanidine reductase (LAR), said third

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nucleic acid portion comprising a nucleotide sequence selected from the group consisting of:

(A3) Sequence ID No. 11,13, and 15 and the complements thereof;

(B3) nucleotide sequences encoding Sequence ID No. 12, 14, and 16, and the complements thereof; and

(C3) functionally active fragments of the sequences recited in (A3) , and (B3), said functionally active fragments having a size of at least 60 nucleotides; and

101. (new) The nucleic acid construct of claim 100, wherein said third nucleic acid portion comprises a nucleotide sequence selected from the group consisting of:

(A3.1) full-length sequences antisense to Sequence ID No. 11;

(B3.1) full-length sequences antisense to nucleotide sequences encoding Sequence ID No. 12; and

(C3.1) functionally active fragments of the sequences recited in (A3) and (B3), said functionally active fragments having a size of at least 60 nucleotides;

said construct reducing the levels of each of the CHS, the anthocyanine reductase and the LAR when the construct is introduced into a plant cell.

102.(new) The nucleic acid construct of claim 100, wherein

the first nucleic acid portion comprises a nucleotide sequence selected from the group consisting of:

(A1.1) full-length sequences antisense to Sequence ID No. 1;

(B1.1) full-length sequences antisense to nucleotide sequences encoding Sequence ID No. 2; and

(C1.1) functionally active fragments of the sequences recited in (A1.1) and (B1.1), said functionally active fragments having a size of at least 60 nucleotides; and

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the second nucleic acid portion comprises a nucleotide sequence selected from the group consisting of:

- (A2.1) full-length sequences antisense Sequence ID No. 9;
- (B2.1) full length sequences antisense to nucleotide sequences encoding Sequence ID No. 10; and
- (C2.1) functionally active fragments of the sequences recited in (A2.1) and (B2.1), said functionally active fragments having a size of at least 60 nucleotides.